

Assignment 1 | FPGA Lab

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1 Question

A training institute intends to give scholarships to its students as per the criteria given below :

- The student has excellent academic record but is financially weak.

OR

- The student does not have an excellent academic record and belongs to a backward class.

OR

- The student does not have an excellent academic record and is physically impaired.

The inputs are:

INPUTS

A: Has excellent academic record

F: Financially sound

C: Belongs to a backward class

I: Is physically impaired (In all the above cases 1 indicates yes and 0 indicates no).

Output : X [1 indicates yes, 0 indicates no for all cases]

Draw the truth table for the inputs and outputs given above and write the SOP expression for $X(A,F,C,I)$.

2 Solution

2.1 Truth Table

<i>A</i>	<i>F</i>	<i>C</i>	<i>I</i>	X
<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>
<i>F</i>	<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>
<i>F</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>
<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>	<i>T</i>
<i>F</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>F</i>
<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>T</i>
<i>F</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>T</i>
<i>F</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>
<i>T</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>T</i>
<i>T</i>	<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>
<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>
<i>T</i>	<i>F</i>	<i>T</i>	<i>T</i>	<i>T</i>
<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>F</i>
<i>T</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>
<i>T</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>
<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>F</i>

2.2 SOP EXPRESSION

$$X = A.F^{\complement} + A^{\complement}.C + A^{\complement}.I \quad (1)$$